Outline of the proposed research topic

“HYDROBIOLOGICAL STUDIES OF SELECTED FRESHWATER BODIES OF JINTUR, DISTRICT PARBHANI (M.S.) INDIA”.

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Introduction

Water is very important abiotic natural resource. It is said as liquid of lifewhich is essence of all living process. Water is universal solvent as it dissolves more substances than any other liquid without undergoing any change. Thus it is unique component of nature has played an important role in the life from molecules to man, hence since the time unmemorable the great human civilization has originated , evolved and flourished around water resources. Water covers 70% of the earth surface but only 2.7% of the total water in the rivers, lakes atmosphere and as biological water. It has been estimated that only 0.00192% of the total water on earth is available for human consumption.(Trivedy,1998)

Water is a biological need of all the living things. About 70% of the earth's surface is covered with water, in which 97 % water is mariner salt water contributing less than 3% of freshwater (Wetzel, 1983).Fresh water systems are commonly divided into two major categories – the lentic or standing water systems e.g. Ponds, Dams, Lakes etc.and the lotic or running water systems River,Sperings,streams. Both systems share certain chemical, physical and biological characteristics.

According to different surveys, 70 to 80 % of the Indian water sources are polluted and different enteric diseases affect millions of the peoples every year. United NationsOrganization reports have indicated that majority of world population lack reliable sources of drinking water. Thus it is apparent that appropriate and scientific steps are essential to reduce stresses of pollution and deterioration of fresh water ecosystems, otherwise the fresh water will become the limiting factors of human society.(Odum,1975)

Aquatic organisms need a healthy environment with adequate nutrients for their growth and development. Fluctuations in level of water quality may lead to abrupt changes in the aquatic life. The interactions of physical and chemical content of water play a significant role in composition, distribution and abundance of aquatic organisms (Mustapha and Omotosho, 2005).

Water is one of the necessities of life. We need water for various activities. water is said as a liquid of life and it is the essence of all living processes. It is also called the universal solvent because it dissolves in more substances than any other liquid without undergoing any chemical change. Thus water; the unique component of the environment plays a vital role in life from molecules to man hence since time unmemorable the great civilization has originated evolved and flourished around water resources.

In India, there are approximately 1,17,000 small and large natural and manmade freshwater bodies (Ann. India 1983). Most of the small water bodies are located in the vicinity of temples and mosques like religious places. Most of the 'Yatras' and Melasis celebrated near these lakes. Day-to-day maintenance of these reservoirs is neglected. These activities cause pollution of these holy water bodies. Water is valuable and therefore every person on the

earth must conserve all the available water.

Rivers are vital and vulnerable freshwater systems that are critical for the sustenance of all lives. However, the declining quality of the water in these systems threatens their sustainability and is therefore a cause for concern. Rivers are waterways of strategic importance across the world, providing main water resources for domestic, industrial and agricultural purposes (Prakash*et al.*, 2020)

The qualitative and quantitative changes of freshwater usually affect every part of the environment present in the biosphere. The researchers have very well known that limnological and Hydrobiological studies are vital to make the plan the steps to conserve and keep the valuable inland waters.

Some work has been done on biological and Physico-chemical assessment and their functional dynamics in the aquatic environment all over the world. Water is necessary for life and its betterment continuation on earth. But yet there are many aquatic ecosystems in the JinturTaluka which are remained unnoticed up to till.

Water quality plays a role in the distribution of fish (Welcomme, 1979). The changes in temperature, transparency, DO, COD, nitrate and phosphate has impact on the function and biodiversity of water body (Mustapha, 2008).

Limnology is the study of freshwater ecosystems of all kinds. The word limnology was first time used by Forel (1892-1904) in his studies on Lake Geneva. The other pioneer workers like Frobes (1877) and Thienemann (1925) have studied the limnological parameters of various lakes without relating them to biological events occurring in the ecosystem

present work of the freshwater ecosystems in JinturTaluka are investigated for Hydrobiological studies. The Karpariver,Pungla I Minor Irrigation Project, BhogaonMinor Irrigation Project are located near JinturTaluka,

are important aquatic ecosystems that are affected by various activities of human beings.

The water is also used for, agriculture, pisciculture, cattle, washing of vehicles, clothes, and disposal of domestic sewage. Hence the present work has been undertaken.

In Maharashtra majority of manmade water bodies were constructed during 1972's famine by the Govt. of Maharashtra under Employment Guarantee Scheme (EGS).The Minor Irrigation Porject of JinturTaluka of parbhani District of Maharashtra are constructed used for irrigation, domestic and for aquaculture purpose. Still today, the hydrobiological studies of these water bodies are not carried out, so the present topic is selected for investigation

PERPOSE OF CARRYING OUT PROPOSED RESEARCH WORK

The study deals with the seasonal variation in hydrobiological parameters of Selected water bodies of jintur taluka. The hydrobiological parameters such as Temperature, Dissolved oxygen PH, Alkalinity, Hardness, TDS and BOD of water playing an important role in the distribution of planktonic fauna. The work on hydrobiological parameters provides information on quality of water of Selected water bodies of jintur taluka.

REVIEW OF LITERATURE

Bhosale and Bhat (2006) investigated the zooplankton distribution in the Karwar water in Karanataka. Kamble*et al.,* (2008) estimated the seasonal variation in the

Physico-chemical parameters of Khadakwasala reservoir, Pune (M.S.).
Bade and Kulkarni (2008) estimated the hydrobiological aspects of Sai Reservoir, Latur Maharashtra

Shinde S. E. et. al. (2010) studied the physico-chemical characteristics of Harsool-Savangi dam, Aurangabad district, India and recorded seasonal variations at four different sampling sites.

Mane *et al.,* (2010) reported the Chemical and bacteriological status of Yeoti like Mohol Dist. Solapur (M.S.). Manjare*et al.,* (2010) assessed the water quality assessment of the Vadagaon tank, Kolhapur (M.S.). Upadhyay and Gupta (2013) assessed the water quality using its Physico-

Gaike P. P. ; P. V. Patil and K. B. Shejule (2011)

The hydrobiological study of Dahipal dam, district Jalna (M.S.) India, was carried out by Gaike P. P. et. al. (2011) and recorded the seasonal variations of physico-chemical parameters.

M. Thirupathaiah, CH. Samatha and CH. Sammaiha (2011) Diversity of zooplanktons in the Kamalapur lake was studied by M. Thirupathaiah et. al. (2011) and reported about 18 species of Zooplanktons chemical parameters of KudaidaminMangelidist, Chattisgarh.

Dr. Manoj Kumar Et .al (2016) Hydro biological study of the Yamuna river at Kalpi in India was carried out for a period of twelve month (Oct2013 to Sep 2014). Collected samples were evaluated for physico-chemical parameters and fishes. Present study reveals that water quality of the Yamuna river was not fit for drinking purpose but it was satisfactory for fish culture and irrigation purpose. Presence of both pollution tolerant and pollution intolerant species of biological parameters shows that this water was moderately polluted during course of study.

ASHOK KUMAR VERMA(2016) The purpose of present study is to understand the hydrobiologicalproperties of Muntjibpur pond. The study was conducted period of one year from Jan 2014 to Dec 2014. Various hydrobiological parameters are analyzed with the help

of hydrobiological kits and standard chemical methods. Seasonally analysed samples indicated that the water quality of the said pond is although

Rohankar and Dahegaonkar (2016) studied the diversity of zooplankton in Velgurelake near Aheri dist. Gadchiroli, Maharashtra, India.

Bunkar and Tiwari (2017) worked on zooplankton diversity in Barchor Dam, Sidhi (M.P) India. Rao (2017) worked on zooplankton diversity and seasonal variation of Tandavareserviour, Visakhapatnam, India.

Sharma *et al.,* (2017) worked on seasonal variations in the Physico-chemical parameters of Dilli pond, Sainik colony, J&K. Padmaja*et al.,* (2017) worked on the assessment of water quality of Himayathsagar Lake in Hyderabad-A case study. Mishra (2017) worked on the Physico-chemical parameters of water body Benisagar Dam, Satna (M.P.) Pawar, and Pejaver (2017) Limnological studies of Ninje and Goveli ponds of KalyanTaluka (Maharashtra), India.

Shazia Ansari and S.K Singh (2017)

Study of two ponds of semiarid zone of Western Uttar Pradesh was carried out in Aligarh to determine its limnology, in relation to diversity of phytoplankton population. In the present study it was noted that no single environmental factor was responsible for the production of phytoplankton organisms but a number of factors acted together to bring the cumulative effect. Most of the phytoplankton were found to flourish at mesophytic environment. Growth of phytoplankton was directly or indirectly dependent upon the concentration of nutrients in both the ponds as evident by the study.

Amrita P Shivani Et.al (2019)

The study was carried out to highlights the water quality status of lake Pichola, Udaipur (Rajasthan). The water samples were collected on monthly interval from four preselected sampling stations. The range of important water quality parameter were observed. Water quality parameters were compared with reported optimum water quality standards prescribed for fish farming or aquaculture are found within limit. The results revealed that aquatic environment of Pichola Lake is conducive for fish growth and water is not only suitable for fish farming but also for irrigation

Dev Brat Mishra and PrabhakarSingh(2020):

study was to investigate the physico-chemical parameters of Balapur pond of Prayagraj (U.P.), India. The study was conducted from April 2019 to March 2020. A significant level of variation was found with respect to these parameters throughout the study period. Systematically analyzed month wise samples indicated that the water quality of the pond studied is although having some pollutants but is more or less suitable for fish culture purposes

OBJECTIVES OF THE RESEARCH WORK:

Present work is undertaken with the following objectives.

- To determine the seasonal changes in the physicochemical parameterof the water from Selected water bodies from Jintur taluka
- To assess the seasonal variation in zooplankton population and Ichthyofauna
- To Study quantitative and qualitative analysis of Zooplankton
- To know the pollutional status of water body
- To find the interrelationship between these Physico-chemical parameters and diversity zooplankton.
- Morphometric study of selected water bodies with respect to location, water spread, water storage capacity.
- The study also comprises the comparison of water quality from these water bodies with standards water quality parameters for different purposes for which it is used.
- To propose remedial steps for conservation of the present ecosystems

Hypothesis:

The proposed work will add to the knowledge of the physical and chemical parameters of water for the selected study site. From this study, we can get knowledge of the freshwater fauna of the Selected water Bodies of Jintur. This study will provide the baseline for the ecology of the selected area.

METHODOLOGY TO BE ADOPTED

This is a very important section of the research that decides the success of achieving the objectives. Following standard methods and procedures will be used related to survey, collection, processing, preservation of biological materials for the taxonomic study to identify the species diversity of Zooplankton and fishes.

This studies will be made to analyze the Hydrobiological parameters of the Selected water bodies from Jintur taluka

1) Karpara River
2) Pungla I Minor Irrigation Project
3) BhogaonMinor Irrigation Project

During this study the water samples will collect early in the first week of each month for two years Three different spots will be selected for the sampling of the Selected Water Bodies from JinturTaluka. The samples will be collected on separate days

from each spot of the water body. The fish fauna will be collected with the help of local fishermen and researchers themselves and by visiting the local fish market. The analysis of samples will do by using standard literature methods

1**. Studies on Physico- chemical parameter of Selected water bodies from Jinturtaluka**

Physical parameters will be analyzed by using the standard method for the examination of water suggested by-American Public Health Association (APHA-1992) such aswater temperature, humidity, pH, transparency, specific conductivity, and T.D.S.

The chemical parameters will be check like - D.O., free CO2, alkalinity, carbonates, bicarbonates, total hardness, calcium, magnesium, chlorides, phosphates, and nitrates. etc.

2. Studies on Zooplankton Population

Four major groups of zooplankton (Rotifera, Cladocera, Copepoda, and Ostracoda) will be studied for the diversity and density of aquatic animals. The work will aim to investigate the effect of changes in qualitatively and quantitatively water quality on plankton fauna.

For zooplankton analysis, samples of zooplanktons will be taken into Sedgwick Rafter cell and identification of zooplankton will be carried out, and the counting will be done following the work of Edmondson, Nayar (1977), (1970), Pennak (1989), Tonapi (1980), APHA (1989), Standard keys and other works of literature will be used for identification of different species and the identified species were expressed in number per liter

3. Studies on Fish fauna :

Taxonomy of Fishes:

Fishes will be collected from Dam and identified for the fish diversity study by using standard literature.

by random sampling the fish samples will be collected and identified with the help of photo and onboard measurement for morphometrics and meristics characters by using a digital veneer caliper scale. Micro-tissues samples, scales on the body will be collected for the molecular taxonomic study. Fish abundance by the number of fish species will be calculated. Fish will be identified using (www.fishbase.org) by force and Pauly (2019), (Jayram 2010,2012.

The morphometric study of the selected water bodies from jinturtaluka will be carried out by collecting the data from the irrigation department of Jinturtaluka and partly it will be determined by direct measurement in the field.

Important of study

International status

Reservoirs are obstructing rivers worldwide, impairing habitat and migration opportunities for numerous freshwater fish species; however, global facts linking dam and fish distributions have been inadequate. Reservoirs constitute themain threat to global freshwater species diversity (Vörösmarty et al. 2010); they lead to loss of native species but also to invasion by exotic species, partly because exotic species are likely to establish in degraded or modified freshwaters (Poff et al. 2007). The implications of reservoir obstruction for local freshwater diversity have been studied in small-scale studies (e.g., Anderson et al. 2006), but a paucity of global-scale information has constrained large-scale freshwater management planning (but see Thieme et al. 2007).

Reservoirs contribute to water security, energy supply, and floodprotection but also fragment habitats of freshwater species. Yet,a global species-level examination of reservoir-induced fragmentation islacking. Current levels of fragmentationwere highest in the United States, Europe, South Africa, India, and China.

National status

India is the seventh-largest country in the world covering an area of 32, 87,590 sq.km, the largest landmass of the Indian subcontinent, and lies to the north of the equator between 6° 45′ (the southernmostextremity, the Indira Point inGreat Nicobar Islands of the Indianterritory) and 37° 6′ north latitudeand 68° 7′ and 97° 25′ east longitude.

India is endowed with notablebiodiversity in its diverse ecosystemsand habitats that are distributed invaried, but unique biogeographic zones.Its biodiversity richness is well-reflected in the fauna of not only the terrestrialecosystems but also the aquatic ecosystems (i.e., the marine and freshwaters).India is one among the seventeen mega biodiversity nations known from theworld and occupies the 9th position in terms of freshwater mega biodiversity (Mittermeier *et al*., 1997).

The freshwater ecosystems of India include all types of inland wetlands:lakes, rivers, ponds, streams, groundwater, springs, cave waters, floodplains, aswell as bogs, marshes, and swamps. India with 2.4% of the global landmass has 4%of the world's freshwater resources (source: the Ministry of Water Resources,Govt. of India). The abundant water resources include 29,000 km of rivers, 3.15million hectares of reservoirs, 2.35 million hectares of ponds and tanks, 0.2 millionhectares of floodplains, and 33 wetlands (Ayyappan, 2007).

Therefore, there is a need to search for the current status of the diversity of Zooplankton which will act as the major source of food for aquatic animals. The present study identifies the exact physiochemical status of water from the Selected water Bodies

from Jintur which helps in the successful management and conservation of reservoirs from the different current threats and the proposed work may help developfuture planning of the reservoir. and effective management.

SIGNIFICANCE OF THE STUDY:

1. To help for providing pure water to the public for drinking and domestic purposes.
2. To assess whether the water is suitable for agricultural purposes.
3. To study the percentage of contaminants that are hazardous to human health and agricultural production.
4. To study sustainable economic development of the community which is
5. directly or indirectly dependent on the water bodies.
6. To check the efficiency, uniformity, and consistency of the treatment and purification process.
7. To study the pollution status of the water in these water bodies.
8. To study proper utilization of natural resources.
9. The data obtained from this work will suggest preservative and conservative measures for the water reservoirs and communities inhabiting in water.
10. This study will also be helpful to provide a data bank for the Hydrobiological studies.
11. The study will help an important role in planning activation and strengthening biodiversity.

Proposed plan of work

Year-wise work plan of research.

The research duration is the present study is about four years from Year Dec-2022 to Dec. 2025. (May be extended one year) up to Dec 2026.

First-year – course work and extensive collection and reading research papers, literatures, etc.

Second-year- fieldwork (The sample collection and analysis) and publication of research papers.

Third-year-fieldwork (The sample collection and analyasis) and publication of research papers.

Fourth-year: writing of the thesis and presenting data in viva.

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